Special Article

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Medical Insurance Feasibility Study

A Technical Summary

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There are risks of adverse outcomes to patients in the course of health care management. A study was undertaken to measure these outcomes in California for 1974. Secondary benefits of the study include new insights into the types and sources of disabilities caused by health care management and the development of new methods for carrying out generic adverse-outcome monitoring.

IN THE PAST FEW YEARS, California's professional liability insurance market has been in a crisis, with skyrocketing premium costs and limited availability of insurance. The effect of this crisis has notably increased the overall costs of health care in California.

In the public interest, the California Medical Association (CMA) and the California Hospital Association (CHA) felt it necessary to determine the feasibility of alternative systems of patient-disability compensation. What is needed, in contrast to the existing malpractice trials under tort law, is a system that will cost less to administer, and will stabilize compensation through scheduled, standardized benefits. In this way, patients who have disabilities as a result of health care management could be fairly compensated automatically, without having to prove fault. However, reasonable cost estimates for such alternative plans cannot be made without valid information concerning the type, frequency and severity of those disabilities for which compensation might be paid. Consequently, the Medical Insurance Feasibility Study* was undertaken.

It was the purpose of the study to obtain adequate information about patient disabilities resulting from health care management. In accomplishing this goal, the investigators did not intend to measure the quality of health care in California or to propose any particular compensation plan. However, the study developed classifications, nomenclature and evaluation techniques which, if utilized in a patient-compensation program, could lower administrative costs in contrast to the current courtroom system.

The author of this article was contractor, administrator and editor for the study. The principal investigators were the author; David S. Rubsamen, MD, LLB, of Berkeley; and John S. Boyden, Jr., MD, LLB, of Salt Lake City. With the help of CMA and CHA staffs, and with the assistance of outside experts providing medical auditing, data retrieval, and actuarial and biostatistical services, a random

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sample of 20,864 inhospital patient charts from 23 representative California hospitals was reviewed. All charts had discharge dates in 1974. This sample so closely matched a 759,223 sample from data supplied by the California Health Data Corporation for patient discharges in 1974 that the statistics developed in the study can be generalized to the universe of patients (3,011,000) admitted to short-term, acute care, nonfederal general hospitals in California in 1974.

The study was carried out in such a way as to eliminate the identification of all physicians and patients involved in the sample. The official report also eliminated the identification of participating hospitals.

Definitions

In order to accommodate a variety of compensation plans, the following definitions and classifications were created:

- *A potentially compensable event* (PCE) is a disability caused by health care management.
- A *disability* is a temporary or permanent impairment of physical or mental function (including disfigurement) or economic loss in the absence of such impairment.
- *Causation* is established when the disability is more probably than not attributable to health care management.
- *Health care management* includes both actions (commission) and inactions (omission) of any health care provider or attendant, whether or not the action or inaction constitutes legal fault.

While all PCE's are defined as disabilities caused by health care management, subdivisions were required since variations arise in their origin and proof:

- *Class 1—Adverse effects of treatment or procedures:* The occurrence of a new abnormal condition caused by a treatment or procedure, either diagnostic or therapeutic. This class involves the adverse effects of commission in health care management. Despite the reason for the treatment or procedure, the adverse effect itself is the measurable outcome (for example, postoperative wound infections, and drug reactions).
- *Class 2—Effects of incomplete diagnosis or treatment:* The occurrence of a discrepancy between the expected and demonstrated outcomes of an original abnormal condition for which health care management was sought or rendered. This class involves the failure to realize an expected outcome based upon the standard of optimal capacity (defined as the ultimate capability of a well-trained specialist, under optimal conditions, to accomplish an intended medical or surgical goal in the majority of instances). The optimal capacity standard represents the nearest approach in defining the limits of medical science. It is, in essence, the highest possible standard that might be applied to the process of medical care. This class includes acts of commission and omission in health care management (for example, delayed diagnosis and treatment of acute appendicitis leading to rupture of the appendix, requiring prolonged management).
- *Class 3—Effects of incomplete prevention or protection:* The occurrence of an abnormal condition caused by incomplete preventive or protective health care management. This class deals with abnormal conditions that are foreseeable and preventable under the standard of optimal capacity and are caused by omissions in health care management. The expected outcome for this class is always the prevention of the abnormal condition that constitutes the disability (for example, a disability arising from the fall of a sedated patient out of a hospital bed).

Three other classes were created but eliminated because they were not specifically measurable in this study. The omission of these classes, however, does not alter the significance of the final results. Most of the "excluded" PCE's were also measurable (and were measured) in classes 1, 2 and 3 if consequential disabilities had occurred.

Data Source

In the absence of an existing reporting system sufficiently reliable to measure PCE's, original patients' records were examined. Hospital charts, rather than physicians' office or clinic records, were chosen to ensure greater uniformity and statistical validity. To determine the frequency with which PCE's might be missed by reviewing inpatient charts only, 928 clinic records were examined in the sample hospitals; two PCE's (0.22 percent) were found. Both were minor, temporary disabilities. Neither would have been discovered by examining inpatient charts alone. While this exercise did not exclude the existence of PCE's not discoverable through review of inpatient charts, it did provide reason to believe that PCE's limited to outpatient causes and management are relatively few in number and minor in severity.

TABLE 1.—*The Seven-Grade Severity Scale Adopted for the Study*

Code	Description
3.0	*Minor temporary disability:* Not exceeding 30 days and not requiring surgery for its correction or treatment.
3.1	*Minor temporary disability:* Not exceeding 30 days but requiring surgery for its correction or treatment.
3.2	*Major temporary disability:* Lasting for more than 30 days but not longer than two years.
3.3	*Minor permanent partial disability:* Permanent conditions which are not functionally disabling in reference to everyday living and working (e.g., loss of spleen, loss of uterus).
3.4	*Major permanent partial disability:* Substantial damage, but not sufficient to cause complete loss of ability to perform most ordinary functions.
3.5	*Major permanent total disability:* Substantial damage, usually sufficient to alter life-style into a dependent position.
3.6	*Grave permanent total disability:* Complete dependency or short-term fatal prognosis.
3.7	*Death*

Threshold

Since a myriad of inconsequential events occur in health care management, a minimum threshold was required for carrying out this study. A disability (PCE) was counted only if it met one or more of the following conditions:

1. It *occurred during* the sample hospital stay and *lengthened* the patient's stay, or it *continued* after discharge from the hospital (for example, postoperative wound infection that did not heal substantially within the assigned length of stay).

2. It *necessitated* the sample hospital stay for observation or treatment (for example, admission for observation following a drug reaction in a physician's office).

3. It was *treated* during the sample hospital stay even though it occurred before admission and was not the reason for admission (for example, a patient is admitted for a fractured arm; during the time in hospital an abdominal, incisional hernia from a previous surgical procedure was repaired).

4. It was *present* during the sample hospital stay although it had occurred before admission, was not the reason for admission and was not treated during this admission, provided: (a) it had a severity rating of at least "major permanent partial disability," (b) it is not the type of disability that usually requires hospital admission for its management, (c) it arose from events subsequent to December 31, 1968—an arbitrary cutoff date—(for example, a child born in 1970, now blind from retrolental fibroplasia, was admitted to the sample hospital for the treatment of pneumonia. If this child's chart was part of the sample, the retrolental fibroplasia would constitute a PCE).

5. It was *caused* by an event *during* the sample hospital stay but did not become evident until readmission to hospital (for example, delayed small bowel obstruction due to adhesions following a hysterectomy done during the sample admission).

Conversely, a disability was not counted if it occurred during the sample hospital admission; it completely, or nearly completely, was resolved within the assigned length of stay; and it would probably not cause continuing disability following discharge.

Severity of Disability

A seven-grade severity scale, adopted from the Workers' Compensation program, was modified for the study (see Table 1). The modifications are similar to those utilized by the National Association of Insurance Commissioners in its 1975-1976 malpractice claims review.

Conduct of Study

After the creation of the preceding definitions and rules, participating hospitals were instructed on the selection of 1974 charts by department and quarter of the year. Because a large sample was required for statistical significance, a method of screening by trained data retrievers was established. With the assistance of medical audit experts the investigators created a set of 20 generic (nondisease and nonprocedure specific) screening criteria (discussed at length in the published report). They proved effective to eliminate 50 percent of the sample charts while missing less than 1 percent of the PCE's. The remaining 50 percent were then reviewed by one or more of the investigators to determine the presence or absence of PCE's. All positive findings were reviewed in group sessions to confirm the proof required for each PCE and to assure proper coding sequences. All final data were entered on an IBM System 32 computer.

PCE Results

In all, 970 PCE's were found to be attributable to 1974. This was 4.65 percent of the entire sam-

ple. Divided into classes, the values shown in Table 2 were produced.

Generally, PCE's occurred equally in both sexes; however, patients 65 and over had a significantly higher rate than those under 65 ($P<.05$). When PCE occurrences were correlated with the primary source of medical care payment, patients receiving health care at government expense had significantly higher rates than others ($P<.05$). Interestingly, this difference arose primarily in groups of patients under 65 (Table 3).

Distributing the PCE's on the severity scale shows 80 percent to have been temporary disabilities; 6.5 percent, minor permanent; 3.8 percent, major permanent, and 9.7 percent, death (Table 4).

Though the total risk of PCE's was less than 5 percent, the statistical expansion of occurrences from the sample to the statewide hospital population in 1974 produced sizable results: 140,000±8,700. Of these, 112,000 (80 percent) were temporary disabilities (86,000 lasted 30 days or less), and another 9,100 (6.5 percent) involved no functional handicaps for daily living and working. Only 5,300 (3.8 percent) were associated with lasting, functional disabilities. The final 13,600 (9.7 percent) PCE's resulted in death, but 25 percent (3,400) of these occurred in patients who probably would have died within one year from unrelated, underlying diseases or conditions (for example, a patient with terminal cancer who died prematurely from adverse effects of antineoplastic therapy).

Tort Liability

Part of the study was devoted to determining which PCE's would probably result in verdicts in favor of patients (or heirs) if malpractice lawsuits had been filed. In arriving at this decision, the investigators took many factors into account, such as the type and severity of the PCE, the circumstances by which it occurred and was managed and the state of the medical records.

Only a fraction of 1 percent (0.79 percent; n=20,864) of sample charts disclosed evidence indicating the probability of liability for incurred PCE's. Expanded to the statewide hospital population in 1974, this small rate still produced 23,800 ±3,600 liability PCE's, representing 17 percent of all PCE's. However, only 2,600 involved substantial, permanent disabilities. Another 5,800 resulted in death, but this figure includes 800 patients who probably would have died within one year from unrelated, underlying diseases or conditions.

Since most patients who file lawsuits for medically caused disabilities do so without real knowledge about the presence or absence of legal fault

TABLE 2.—*PCE Incidence Rates for 1974 (n=20,864)*

Class	PCE's*	Percent of Total	Rates and Ranges†
1	796	82	3.81±.26%
2	144	15	0.69±.11%
3	30	3	0.15±.05%
Total	970	100	4.65±.29%

*All reported occurrences have been rounded to the nearest integer. Fractional occurrences had been produced by reconstituting a 0.75 sampling of charts of patients 65 years of age and older. All incidence rates and ranges were calculated on occurrences to the 4th decimal.

†All estimates of ranges are based on a probability of .95.

TABLE 4.—*PCE's by Severity (n=970)*

Severity Code	PCE's: Percent of Total
3.0	35.7
3.1	25.7
3.2	18.6
3.3	6.5
3.4	2.2
3.5	1.0
3.6	0.6
3.7	9.7
	100.0

TABLE 3.—*PCE Rates by Age and Health Care Payment Source**

Age	All Sources		Government†		Nongovernment‡	
	n	Rate and Range	n	Rate and Range	n	Rate and Range
65 and over	3,826	7.22±0.82%	3,483	7.32±0.87%	181	6.60±3.62%
Under 65	17,038	4.07±0.30%	3,566	5.16±0.73%	10,589	3.77±0.36%
All ages	20,864	4.65±0.29%	7,049	6.23±0.56%	10,770	3.83±0.36%

*The division into governmental and nongovernmental sources was based on 85 percent of sample. The payment source could not be determined in the remainder.

†Medicare, Crippled Children's Service, Medicaid (Medi-Cal), Welfare.

‡Private insurance, prepay/HMO, self-pay.

TABLE 5.—*Proportion of Liability PCE's and All PCE's by Severity*

Severity	*All PCE's as Percent of Total (n=970)*	*Liability PCE's as Percent of Total (n=165)*	*Liability PCE's as a Percent of all PCE's in Each Category*
Temporary (codes 3.0-3.2)	80.0	55.8	11.9
Minor permanent (code 3.3)	6.5	9.1	23.8
Major permanent (codes 3.4-3.6) .	3.8	10.9	48.6
Death (code 3.7)	9.7	24.2	42.6
	100.0	100.0	17.0

TABLE 6.—*Relative Occurrence of Causal Factors Leading to PCE's*

Percent of Total	*Causative Event*
66.1	Specific procedures
18.8	Drugs and biologics
4.1	Medical devices
2.7	Nondiagnosis
2.6	General medical management
2.2	Misdiagnosis
2.0	Anesthetic management
1.6	Nursing management
100.1	

TABLE 7.—*Location of Causal Events in Sample Hospitals Leading to PCE's*

Percent of Total	*Location*
71.8	Operating room
12.0	Patient's room
5.8	Radiology
4.6	Labor and delivery
2.6	Emergency room
0.7	Nursery
0.4	Critical care units
2.1	Unknown/other
100.0	

as the cause of their disabilities, they have, on an average, only a 17 percent chance of success in their legal ventures. Just the few with more severe permanent disabilities and death have substantially better odds (44.3 percent) for successful legal outcomes.

Though PCE's generally occurred with greater frequency in older age groups, the proportion of liability PCE's was relatively constant among all age groups.

PCE's involving liability were, as a group, more severe than PCE's generally; therefore, the more severe the disability, the greater the risk of liability (Table 5).

Medical Causative Events

To gain preliminary insight into the types of health care management events that led to the PCE's measured in the study, PCE's of all classes were allocated to the primary causative categories listed in Table 6.

Based on the entire sample, a third of the causal events leading to PCE's occurred in the sample hospitals during the current admissions, a third occurred in the sample hospitals during previous admissions and a third occurred in some other hospital or medical office ("elsewhere"). Of all PCE's that arose from causal events in the sample hospitals, 72 percent were related to operating room events; only 2.6 percent were related to events in emergency rooms (see Table 7).

Other Observations

Postprocedural infections comprised the most frequent Class 1 PCE arising from specific procedures (29 percent). The procedure most frequently producing Class 1 PCE's was the total hysterectomy (6 percent). The largest single source of Class 2 PCE's was the management of fractures and dislocations (30 percent). Of causal events leading to Class 3 PCE's, 46 percent were related to nursing management.

Ten drugs were responsible for over 60 percent of all drug-caused PCE's. The leaders were estrogens and progestins, anticoagulants, adrenocorticoids and aspirin.

Patient-Caused Disabilities

Patients, themselves, were responsible for 12,-600±2,700 disabilities discovered in the study to be attributable to 1974 (rate=0.42±.09 percent; n=20,864). Causative factors were either self-management of diseases or injuries, or failure to follow medical advice. Most such disabilities, however, were minor in severity. Drugs taken for health management purposes (not drug abuse)

accounted for 56 percent. Of the patient-caused disabilities arising from drugs, 49 percent were due to aspirin.

Conclusion

The purpose of the study was to accumulate data about the PCE universe to provide the opportunity to consider alternative compensation plans. This goal has been achieved. Secondary benefits have also accrued: (1) Medicine now has added insight into the types and sources of disabilities caused by health care management, whether or not due to legal fault; and (2) With modifications and appropriate guidance, hospital medical staffs now have the methodology to undertake generic adverse-outcome monitoring as a basis for self-assessment and prevention, when possible. Finally, the study should leave everyone with the realization that there are finite risks associated with health care management, most of which are unrelated to conduct characterized as legal fault. Society deserves the right to nourish great expectations from the advances in modern medicine, but *no one* should remain unaware that benefits and adverse risks are inseparable. When considering the circumstances under which these risks arise, their incidence rates are remarkably low. Only 4.65 percent of patients admitted to hospital were found to have incurred PCE's, and less than 1 percent of all patients admitted to hospital had PCE's due to legal fault.

Iridocyclitis and Papillitis Following Acute Febrile Respiratory Illness

A CERTAIN TYPE of anterior uveitis, particularly in young persons, appears to crop up about a week or ten days after an acute febrile respiratory illness. This, generally speaking, is an acute iridocyclitis and has been accompanied in a dismaying number of cases by involvement of the optic nerve head, an associated papillitis. That this disease is viral is only presumptive; it has not been proven. But the history of a febrile illness with respiratory symptoms a week or ten days before the onset of ocular symptoms has cropped up again and again in our series and may be important.

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